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The Effect of Stress Inoculation Training on Anxiety and Performance

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Running head: STRESS INOCULATION TRAINING

Abstract

The development of effective training procedures to prepare the individual to resist the negative impact of stress is of considerable interest to government and industry. Stress inoculation training is a cognitive-behavioral stress intervention that has shown considerable promise; however, a number of questions arise regarding the application of this clinically-based approach to more applied settings. A meta-analysis was conducted to determine the overall effectiveness of stress inoculation training and to identify conditions that may moderate the effectiveness of this approach. Results indicated that stress inoculation training was an effective means for reducing performance anxiety, reducing state anxiety, and enhancing performance under stress. Furthermore, the examination of moderators such as the experience of the trainer, the type of setting in which training was implemented, and the type of trainee population revealed no significant limitations on the application of stress inoculation training to normal training environments.

The Effect of Stress Inoculation Training on Anxiety and Performance

One consequence of the rapid technological advances of the past several decades is that many jobs have expanded greatly in complexity and place high demands on the individual. The impact of stress on performance has become a primary concern not only in the high-technology aerospace, military, and nuclear industries, but also in most applied work settings (Ivancevich, Matteson, Freedman, & Phillips, 1990). Accordingly, the development of effective interventions to overcome the detrimental effects of stress is a task that has taken on increased importance in the training community (see Driskell & Salas, 1991; Goldstein, 1989; Goldstein & Gilliam, 1990).

Stress inoculation training is a cognitive-behavioral approach to stress management that was developed in the early 1970's as a treatment program for phobias (Meichenbaum & Cameron, 1972). Since that time, stress inoculation training has been implemented as a stress treatment program with considerable success in a wide range of settings. However, in reviewing stress intervention programs, Newman and Beehr (1979) noted that the most glaring deficiency was the lack of rigorous evaluation, and that much of the research evidence was comprised of case studies, non-empirical reports, and studies lacking appropriate controls. Wexley and Latham (1991) agree: In posing the question of what we can conclude about the effect of stress management programs, they answer that proof of the effectiveness of these programs is difficult to obtain. Therefore, although the preponderance of evidence suggests the efficacy of the stress

inoculation training approach, the overall effectiveness of this approach has not been clearly established (see Meichenbaum, 1993).

This study presents a meta-analysis of the literature on stress inoculation training. The purpose of this study is to integrate the literature on stress inoculation training, provide a summary of the overall effectiveness of this approach, and specify the conditions under which stress inoculation training is most effective.

Stress Inoculation Training

Stress inoculation training was originally developed as a clinical treatment program to teach clients to cope with physical pain, anger, and phobic reactions (see Meichenbaum, 1985, 1993; Meichenbaum & Deffenbacher, 1988). However, stress inoculation training has subsequently been employed as a comprehensive stress training intervention and has been implemented for a variety of applications, such as speech anxiety (Altmaier, Leary, Halpern, & Sellers, 1985), occupational stress (Sharp & Forman, 1985), coping with adverse medical procedures (Jay & Elliott, 1990), and to enhance performance under stress (Bloom & Hautaluoma, 1990).

As the term "inoculation" implies, stress inoculation training is designed to impart skills to enhance resistance to stress. By training effective coping skills prior to stress exposure, the objective of stress inoculation training is to prepare the individual to respond more favorably to negative stress events. The stress inoculation training approach is defined by a 3-stage training intervention. The first phase of training is a conceptualization or educational phase. The goal of

this initial phase of training is to help the individual better understand the nature of stress and stress effects. The second phase of stress inoculation training focuses on skill acquisition and rehearsal. The primary objective of this stage of training is to develop and practice a repertoire of coping skills to reduce anxiety and enhance the capability to respond effectively in the stressful situation. The final phase of stress inoculation training, application and follow-through, involves the application of coping skills in conditions that increasingly approximate the criterion environment. To enhance the transfer of training, trainees may engage in guided imagery or role-play that allows them to apply coping skills in a graduated manner across increasing levels of stress. Although specific stress inoculation training interventions differ according to the type of stress that is targeted by the training (e.g., speech anxiety, test anxiety, etc.) and the specific coping skills emphasized (e.g., relaxation training, cognitive restructuring, or problem solving), the common thread among stress inoculation interventions is that they share these three primary training components.

Although some studies conclude that stress inoculation training is an effective stress intervention (Deffenbacher & Hahnloser, 1981; Register, Beckham, May, & Gustafson, 1991; Sweeney & Horan, 1982), other results have been more equivocal (Bosmajian, 1981; Russler, 1986; Smith & Nye, 1989). It is difficult if not impossible to establish from a narrative review of this literature the overall effectiveness of this approach. In reviewing twenty years of stress inoculation research, Meichenbaum (1993) notes that research is needed on the "usefulness of

stress inoculation training..relative to appropriate control groups. The field needs more documented evidence that stress inoculation training is indeed effective."

Therefore, the first goal of this meta-analysis was to establish the overall significance and magnitude of effect of stress inoculation training: i.e., Is stress inoculation training effective? By integrating the results of studies that have examined the effectiveness of stress inoculation training, we can provide a precise estimate of the typical study outcome within this research domain. Thus, the first objective of this analysis was to establish the overall magnitude of effect of stress inoculation training.

A second goal of this study was to examine factors that may increase or decrease the effectiveness of stress inoculation training. Janis (1983) concluded that "Stress inoculation training often works but sometimes does not. Obviously, the time has come to move on to a more sophisticated phase of research, to investigate systematically the conditions under which stress inoculation is effective" (p.77). Of particular interest, stress inoculation training was developed primarily as a clinical intervention, and retains a strong emphasis on individualized training and the intensive involvement of a skilled facilitator (see Meichenbaum & Deffenbacher, 1988). Therefore, there is some question whether the stress inoculation training approach is applicable to a more applied training environment, in which training is more likely to be administered on a short-term, group basis by a non-Ph.D. level trainer.

Therefore, a second goal of this study was to examine the extent to which the effectiveness of stress inoculation training varied as a function of certain theoretically relevant and practically

important moderators. By examining these relationships at the meta-analytic level, we can assess the extent to which these factors moderate the effectiveness of stress inoculation training. Moreover, we can address several questions of considerable practical interest. For example, stress inoculation training is typically implemented by experienced Ph.D. level trainers; can it be implemented successfully by less experienced trainers? Can training be implemented effectively in group settings? Is training as effective in the field as in the experimental laboratory? In the following, we describe seven factors that may moderate the effectiveness of stress inoculation training: the type of subject population, the number of training sessions, the training setting, the type of skills practice utilized, the size of the trainee group, the experience level of the trainer, and the type of control group employed.

Effects of Moderators

Type of Population

In some studies, subjects were pre-screened and a high anxious population was chosen for training intervention (e.g., Adams, 1981). Other studies used an unscreened or normal anxiety level subject population (e.g., Jay & Elliott, 1990). Some research suggests that high anxious subjects are more likely to be characterized by greater worry and self-doubt, self-deprecation, and preoccupation with interfering thoughts and feelings (Meichenbaum & Butler, 1978; Deffenbacher, 1986). Stress inoculation training practitioners have placed great emphasis on modifying cognitive processes, or the manner in which anxious individuals maintain negative beliefs (Meichenbaum & Deffenbacher, 1988). Therefore, there is some question whether the

stress inoculation training approach may be as effective for a "normal" population that, by definition, is not as self-absorbed by these thoughts and ruminations. Furthermore, it is likely that a high-anxious population may be more responsive to a stress training intervention than normal anxiety-level trainees. Indeed, Fremouw and Zitter (1978) reported a nonsignificant trend indicating that stress inoculation training was more effective for subjects with high anxiety. To examine whether the type of trainee population moderates the effectiveness of stress inoculation training, we examined separately those studies in which stress inoculation training was conducted with a high-anxious subject population and those studies using a normal anxiety subject population.

Number of Training Sessions

Reported studies of stress inoculation training range from a single session administration (Altmaier & Happ, 1985; Payne & Manning, 1990) to as many as ten or more sessions (Lustman & Sowa, 1983; Tableman, Marciniak, Johnson, & Rodgers, 1982). Stress inoculation training practitioners argue that, in the clinical setting, the number of sessions of training presented should be based on the individual needs of the client (Meichenbaum, 1985). However, for training applications, it is valuable to have a more standardized estimate of the amount of training required: For example, are short-term (1 or 2 session) interventions effective, or is more intensive training required for effective stress reduction? Furthermore, if a relatively large number of sessions are required for successful training, this may limit the applicability of this approach in some applied settings. To examine whether the effectiveness of stress inoculation training is

related to the number of training sessions, each study was coded according to the number of training sessions administered.

Training Setting

Studies examining the effectiveness of stress inoculation training have been conducted in both laboratory and field settings. In a typical laboratory study, training is conducted in a university experimental laboratory (Adams, 1981; Blackmore, 1983). Other studies are conducted in field settings such as schools (Sharp & Forman, 1985; Zeidner, Klingman, & Papko, 1988), hospitals (Kendall et al., 1979) and community centers (Tableman et al., 1982). In examining the utility of stress inoculation training for applied training environments, it is relevant to ask whether effects may be limited to controlled laboratory settings, or whether positive training effects extend to field settings.

Type of Practice

During the second phase of stress inoculation training, stress management skills are acquired and practiced. Meichenbaum and Cameron (1983) state that both mental rehearsal (imagery) and behavioral practice (role-playing) may be effective means of rehearsing skills. In a typical study utilizing imagery practice, subjects are directed to imagine the stressor situation and practice using the newly learned coping skills (cf., Register et al., 1991). In studies utilizing behavioral practice, subjects may role-play coping with the stressor situation while integrating the skills learned (cf., Foley, Bedell, LaRocca, Scheinberg, & Reznikoff, 1987). In a review of the effects of mental practice on performance, Driskell, Copper, & Moran (in press) found that mental

practice was an effective training approach, although less effective than actual physical practice. By examining separately studies in which behavioral or cognitive skills practice were used, we are able to assess the relative effectiveness of each approach within the stress inoculation training paradigm.

Group Size

Emphasis is often placed on the individualized nature of stress inoculation training, and on the intensive one-on-one relationship between the therapist and the client (Meichenbaum, 1985; Meichenbaum & Deffenbacher, 1988). However, in practice, stress inoculation training has been implemented on an individual basis (e.g., Jay & Elliott, 1990) as well as in group settings of varying size (e.g., Forman, 1981; Mace & Carroll, 1985). However, the extent to which the size of the treatment group determines the effectiveness of stress inoculation training is unknown. Many applied training settings do not allow the luxury of one-on-one training. Therefore, it is of considerable practical value to examine whether the effectiveness of stress inoculation training is limited by the size of the group.

Experience of the Trainer

Stress inoculation training proponents claim that training can be conducted effectively both by experienced trainers and by less experienced individuals (see Meichenbaum, 1985). However, it is evident that in most research studies, stress inoculation training is implemented by highly trained, doctoral-level professionals. To examine whether the effectiveness of stress inoculation

training is dependent on the experience level of the trainer, each hypothesis test was coded for the experience level of the person conducting the training.

Type of Control

Most studies compared the effects of stress inoculation training to a no contact or wait-list control group, whereas other studies compared stress inoculation training to an equivalent control group. A no-contact or wait-list control group typically receives no contact between initial assignment to treatment/control groups and data collection. By comparison, an equivalent control group engages in some non-treatment activity for a period equivalent to the treatment group. For example, in Neumann (1980), control subjects were given a non-specific treatment providing an equivalent amount of contact time as the treatment subjects. A stress inoculation training/equivalent control group comparison may provide a more robust test of the effects of stress inoculation training than a stress inoculation training/no contact control group comparison. By coding each hypothesis test for whether a no-contact or an equivalent control group was utilized, we examined the extent to which the effect of stress inoculation training was moderated by the type of control group employed.

Procedure

In accordance with the procedures specified in Cooper (1982), Mullen (1989), and Mullen and Rosenthal (1985), an exhaustive search of the literature was conducted to locate relevant studies, using the "ancestry" approach, the "descendancy" approach, the "invisible college" approach, and "key word" searches (sp., stress inoculation, stress training) of computerized

databases such as Psychological Abstracts (PsycINFO), Dissertation Abstracts International, and National Technical Information Service (NTIS). We also manually searched the reference lists of relevant studies, review articles (e.g., Meichenbaum, 1993) and books, and searched through major psychological journals and association proceedings.

Studies were selected for inclusion in this meta-analysis if they reported (or allowed the retrieval of) a comparison of the effectiveness of stress inoculation training versus a control group. In a recent review of stress inoculation research, Meichenbaum (1993) referenced over 200 studies that address the application of stress inoculation training. However, Meichenbaum noted that he cast a wide net in this narrative review, and that this set of studies included case studies, single case clinical interventions, and non-empirical articles, as well as controlled experimental research. In some cases, stress inoculation training was but one component of a broader-based intervention, and other studies employed diverse cognitive-behavioral interventions aligned with stress inoculation training. We note the above to illustrate that the criteria for including studies in this meta-analytic review was much more tightly-focused. First, to be included in this meta-analysis, a study must be clearly described as implementing a stress inoculation training-based intervention or must clearly delineate the application of the three-phase intervention as defined in the stress inoculation training approach. There are any number of training studies that implement some general tripartite intervention (i.e., initial orientation, training, and follow-up) that could be broadly interpreted as a stress inoculation approach. Therefore, to avoid mixing disparate studies, we limited our definition of stress inoculation

training to those studies that were described as incorporating a stress inoculation approach or that explicitly implemented the three phases of the stress inoculation training approach. Second, studies in which the stress inoculation intervention was one component of a broader-based or composite intervention are not legitimate tests of the effects of stress inoculation training and were excluded. Further, to be included in the current analysis, a study must report (or allow the retrieval of) a test of the effectiveness of stress inoculation training relative to a no-treatment control group.

To assess the effectiveness of stress inoculation training, we examined the effects of stress inoculation training on three separate outcome measures: (a) state anxiety, (b) performance anxiety , and (c) performance. In effect, we conducted three separate analyses of the effect of stress inoculation training on these three outcome measures. To be included in the stress inoculation training/state anxiety analysis, a study had to report a test of the effect of stress inoculation training on some measure of state or transitory anxiety, such as the State anxiety scale of the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970). To be included in the stress inoculation training/performance anxiety analysis, a study had to report a test of the effect of stress inoculation training on some specific measure of performance anxiety (these include measures of anxiety specific to the performance targeted in training, such as speech anxiety or test anxiety). To be included in the stress inoculation training/performance analysis, a study had to report a test of the effect of stress inoculation training on actual performance.

In addition to the basic statistical information (statistical test of the hypothesis, corresponding degrees of freedom, sample size, and direction of effect), each data point was coded for the predictors described earlier: the type of subject population, the number of training sessions, the training setting, the type of skills practice utilized, the size of the trainee group, the experience level of the trainer, and the type of control group employed.

A total of 37 studies with 70 separate hypothesis tests, representing the behavior of 1,837 subjects, were included (see Table 1). Examination of the characteristics of the studies in Table 1 reveals that most were published relatively recently (with publication dates ranging from 1977 to 1991) and include both journal articles (20) and dissertations (17). Studies that did not meet the criterion for inclusion in the database and were omitted included those in which the required statistical information was not retrievable (e.g., Altmaier, Ross, Leary, & Thornbrough, 1982; Hytten, Jensen, & Skauli, 1990; Meichenbaum, 1972), studies in which there was no control group (e.g., Schuler, Gilner, Austrin, & Davenport, 1982), and studies in which stress inoculation training was combined with some other type of treatment (e.g., Salovey & Haar, 1990).

Insert Table 1 about here

In the analyses reported below, hypothesis tests were subjected to standard meta-analytic procedures (see Mullen, 1989; Rosenthal, 1991). Combination of significance levels and combination of effect sizes gauge the combined probability and strength (respectively) of the effect of mental practice on performance. Focused comparisons of effect sizes are used to

determine whether effects vary in a predictable way as a function of theoretically relevant predictors. Formulae and computational procedures for these meta-analytic techniques are presented in Mullen (1989) and Rosenthal (1991).

Results

General Effects

Table 2 presents the results of the combinations of significance levels and effect sizes for the hypothesis tests included in the meta-analytic database, weighting each study by its sample size. The results reveal that the overall effect of stress inoculation training on reducing performance anxiety was of strong magnitude, $\underline{r} = .509$, and significant, $\underline{z} = 15.929$, $\underline{p} < .001$. A substantial fail-safe number of Nfs ($\underline{p} = .05$) = 1,456 indicates that it would take over 1,456 additional undiscovered studies averaging no effect of stress inoculation training to reduce the obtained relationship to the .05 level; thus this finding is quite tolerant of future null results.

The overall effect of stress inoculation training on reducing state anxiety was of moderate magnitude, $\underline{r} = .373$, and significant, $\underline{z} = 14.953$, $\underline{p} < .001$. The fail-safe number obtained was Nfs ($\underline{p} = .05$) = 3,410.

The effect of stress inoculation training on enhancing performance was of moderate magnitude, $\underline{r} = .296$, and significant, $\underline{z} = 5.602$, $\underline{p} < .001$. The fail-safe number obtained was Nfs ($\underline{p} = .05$) = 117.

Thus, stress inoculation training was shown to be effective in reducing performance anxiety, reducing state anxiety, and enhancing performance under stress.[1]

Insert Table 2 about here

Type of Population

Separate analyses of the effects of stress inoculation training were conducted for those studies using a high-anxious subject population versus a normal-anxiety subject population (see Table 3). The effect of stress inoculation training on reducing performance anxiety for high-anxious subjects was of moderate-to-strong magnitude, $\underline{r} = .459$, and significant, $\underline{z} = 13.773$, $\underline{p} < .001$. For normal subjects, the effect of stress inoculation training was of strong magnitude, $\underline{r} = .752$, and significant, $\underline{z} = 8.879$, $\underline{p} < .001$. A focused comparison of effect sizes indicates that the tendency for stress inoculation training to exhibit stronger effects for normal-anxiety than for high-anxiety subjects was significant, $\underline{z} = 1.783$, $\underline{p} < .05$.

Insert Table 3 about here

The effect of stress inoculation training on reducing state anxiety for high-anxious subjects was moderate in magnitude, $\underline{r} = .417$, and significant, $\underline{z} = 15.450$, $\underline{p} < .001$. For normal subjects, the effect of stress inoculation training was of small magnitude, $\underline{r} = .269$, and significant, $\underline{z} = 4.473$, $\underline{p} < .001$. A focused comparison of effect sizes indicates that this difference was not significant, $\underline{z} = 1.084$, $\underline{p} > .05$.

The effect of stress inoculation training on improving performance for high-anxious subjects was of moderate magnitude, $\underline{r} = .352$, and significant, $\underline{z} = 5.183$, $\underline{p} < .001$. The enhancement of performance for normal subjects was of small magnitude, $\underline{r} = .237$, and

significant, $z = 3.508$, $p < .001$. The difference in magnitude between these effect sizes was not significant, $z = 1.431$, $p > .05$.

In summary, stress inoculation training was shown to be an effective stress intervention for both high-anxious and normal anxiety subject populations. The data further indicate that the overall positive impact of stress inoculation training on reducing performance anxiety was significantly stronger for normal-anxiety subjects than for high-anxiety subjects. There was no significant relationship between the type of subject and the effect of stress inoculation training on reducing state anxiety or enhancing performance.

Number of Training Sessions

There was a significant positive relationship between the number of practice sessions and the magnitude of effect of stress inoculation training on reducing performance anxiety, $r = .362$, $z = 2.620$, $p < .05$. Thus, as the number of training sessions increase, the beneficial effect of stress inoculation training on reducing performance anxiety increases. Moreover, by using the regression formula, $Z_{Fisher} = .247 + (.0498 * SESSIONS)$, we can derive an estimate of the magnitude of effect of training likely to be obtained based on a given number of training sessions. This analysis reveals that the mean effect of stress inoculation training on performance anxiety reported in Table 2 ($Z_{Fisher} = .562$) can be obtained with a length of training of approximately 6-7 sessions. Furthermore, this analysis indicates that a single training session is likely to be beneficial in reducing performance anxiety to a small-to-moderate degree ($Z_{Fisher} = .296$).

There was also a significant positive relationship between the number of practice sessions and the magnitude of effect of stress inoculation training on reducing state anxiety, $r = .246$, $z = 2.842$, $p < .05$. Using the regression formula, $Z_{Fisher} = .222 + (.0359 * SESSIONS)$, we can estimate that the mean effect of stress inoculation training on state anxiety reported in Table 2 ($Z_{Fisher} = .392$) can be obtained with a length of training of approximately 4-5 sessions. Again, a single training session is likely to be beneficial in reducing state anxiety to a small-to-moderate degree ($Z_{Fisher} = .257$).

The magnitude of effect of stress inoculation training on performance was not predicted by the number of training sessions, $r = -.070$, $z = 0.451$, $p > .05$.

In summary, the beneficial effect of stress inoculation training on reducing performance anxiety and reducing state anxiety increases with increasing training sessions. However, the data suggest that even a minimal training intervention of one session is likely to produce positive effects. The overall positive effect of stress inoculation training on enhancing performance was not moderated by the number of training sessions .

Training Setting

Table 4 reveals that the reduction in performance anxiety rendered by stress inoculation training in field settings was of strong magnitude, $r = .466$, and significant, $z = 9.242$, $p < .001$. In laboratory settings, the effect of stress inoculation training was also of strong magnitude, $r = .530$, and significant, $z = 13.107$, $p < .001$. The difference in magnitude between these two effect sizes was not significant, $z = 0.612$, $p > .05$.

Insert Table 4 about here

The reduction of state anxiety in field settings was of moderate magnitude, $\underline{r} = .387$, and significant, $\underline{z} = 9.539$, $\underline{p} < .001$. In laboratory settings, the effect of stress inoculation training was also of moderate magnitude, $\underline{r} = .363$, and significant, $\underline{z} = 11.626$, $\underline{p} < .001$. This difference was not significant, $\underline{z} = 0.996$, $\underline{p} > .05$.

The enhancement of performance from stress inoculation training in laboratory settings was of small magnitude, $\underline{r} = .241$, and significant, $\underline{z} = 4.851$, $\underline{p} < .001$. There were not enough hypothesis tests in the field settings cell ($k = 1$) to render a meaningful comparison.

In brief, the results of this analysis indicate that the effects of stress inoculation training on reducing performance anxiety and state anxiety are as strong in the field as in the experimental laboratory.

Type of Practice

Separate analyses were conducted of the effectiveness of stress inoculation training interventions utilizing imagery versus behavioral skills practice (see Table 5). Studies using imagery skills practice yielded a strong, $\underline{r} = .613$, and significant, $\underline{z} = 12.70$, $\underline{p} < .001$, effect on reducing performance anxiety. The effect for those studies using behavioral practice was of small magnitude, $\underline{r} = .270$, and significant, $\underline{z} = 2.401$, $\underline{p} < .05$. This tendency for imagery practice to render larger effects than behavioral practice on reducing performance anxiety was significant, $\underline{z} = 3.374$, $\underline{p} < .001$.

Insert Table 5 about here

As a means of reducing state anxiety, the effect of stress inoculation training interventions utilizing imagery practice was of moderate magnitude, $\underline{r} = .404$, and significant, $\underline{z} = 10.370$, $\underline{p} < .001$. The effect for those studies using behavioral practice was also of moderate magnitude, $\underline{r} = .439$, and significant, $\underline{z} = 6.539$, $\underline{p} < .001$. A focused comparison revealed no significant difference between imagery and behavioral practice in reducing state anxiety, $\underline{z} = .964$, $\underline{p} > .05$.

The enhancement of performance from stress inoculation training interventions using imagery practice was of small magnitude, $\underline{r} = .157$, and significant, $\underline{z} = 2.36$, $\underline{p} < .05$. The effect for those studies using behavioral practice was of moderate-to-strong magnitude, $\underline{r} = .476$, and significant, $\underline{z} = 5.261$, $\underline{p} < .001$. The tendency for behavioral practice to render larger effects than imagery practice for improving performance was significant, $\underline{z} = 4.570$, $\underline{p} < .001$.

Thus, for reducing performance anxiety, stress inoculation training incorporating imagery practice was more effective. However, the behavioral practice of coping skills was more effective for enhancing performance.

Group Size

As the size of the training group increases, stress inoculation training becomes less effective in reducing state anxiety, $\underline{r} = -.138$, $\underline{z} = 1.984$, $\underline{p} < .05$. Using the regression formula, $\underline{Z}_{Fisher} = .491 + (-.009 * SIZE)$, we estimate that the overall mean effect of stress inoculation training on reducing state anxiety reported in Table 2 ($\underline{Z}_{Fisher} = .392$) is obtained with a group size of approximately 5-6 trainees. For comparison, with a reasonably large trainee group size of 10

persons, stress inoculation training is still shown to render a moderate impact on reducing state anxiety ($\underline{Z}_{Fisher}$ = .351).

In a similar manner, as the size of the training group increases, stress inoculation training becomes less effective in enhancing performance, $\underline{r}$ = -.659, $\underline{z}$ = 3.849, $\underline{p}$ < .001. Using the regression formula, $\underline{Z}_{Fisher}$ = .689 + (-.046 * SIZE), we estimate that the overall mean effect of stress inoculation training on improving performance reported in Table 2 ($\underline{Z}_{Fisher}$ = .305) is obtained with a group size of approximately 8-9 trainees. Again, although the positive impact of stress inoculation training becomes stronger as the group size decreases, stress inoculation training is shown to be effective in a trainee group of reasonable (8-9 persons) size.

However, this pattern is reversed for performance anxiety: Stress inoculation training becomes more effective at reducing performance anxiety as the size of the group increases, $\underline{r}$ = .342, $\underline{z}$ = 4.958, $\underline{p}$ < .001. Using the regression formula, $\underline{Z}_{Fisher}$ = .351 + (.028 * SIZE), we estimate that the overall mean effect of stress inoculation training on reducing performance anxiety reported in Table 2 ($\underline{Z}_{Fisher}$ = .562) is obtained with a group size of approximately 7-8 trainees. Therefore, stress inoculation training is shown to be effective in reducing performance anxiety in a group setting of moderate size, although it becomes more effective as the size of the group increases.

Experience of the Trainer

Table 6 reports separate analyses conducted for studies in which training was conducted by an experienced trainer (doctoral level and above) and those in which training was conducted by a

less experienced trainer (below doctoral level). The effect of stress inoculation training on reducing performance anxiety for those studies in which experienced trainers were used was of moderate magnitude, $r = .440$, and significant, $z = 6.765$, $p < .001$. For less experienced trainers, the effect was of strong magnitude, $r = .609$, and significant, $z = 13.494$, $p < .001$. This tendency for less experienced trainers to yield stronger effects than those more experienced was significant, $z = 2.326$, $p < .05$.

Table 6 about here

This pattern is upheld for state anxiety and for performance. The effect of stress inoculation training on reducing state anxiety for those studies in which experienced trainers were used was of moderate magnitude, $r = .286$, and significant, $z = 7.854$, $p < .001$. For less experienced trainers, the effect was somewhat stronger, $r = .460$, and significant, $z = 11.375$, $p < .001$. Again, the tendency for less experienced trainers to yield stronger effects than those more experienced was significant, $z = 3.919$, $p < .001$.

The effect of stress inoculation training on enhancing performance for those studies in which experienced trainers were used was of moderate magnitude, $r = .222$, and significant, $z = 3.892$, $p < .001$. For less experienced trainers, the effect was somewhat stronger, $r = .378$, and significant, $z = 3.067$, $p < .05$. Again, this difference was significant, $z = 2.387$, $p < .05$

In summary, stress inoculation training was shown to have a significant impact on reducing performance anxiety, reducing state anxiety, and enhancing performance whether training was

conducted by a more experienced or a less experienced trainer. However, surprisingly, the data indicate that less experienced trainers were more effective than more experienced trainers.

Type of Control Group

The effect of stress inoculation training on reducing performance anxiety for the 5 hypothesis tests employing equivalent control groups was of moderate magnitude, $\underline{r} = .380$, and significant, $\underline{z} = 9.023$, $\underline{p} < .001$. The effect of stress inoculation training for the 14 hypothesis tests employing no-contact control groups was somewhat larger, $\underline{r} = .588$, and significant, $\underline{z} = 14.339$, $\underline{p} < .001$. The focused comparison of effect sizes obtained for equivalent versus no-contact control groups was significant, $\underline{z} = 2.433$, $\underline{p} < .05$.

The effect of stress inoculation training on reducing state anxiety for the 9 hypothesis tests employing equivalent control groups was of small-to-moderate magnitude, $\underline{r} = .287$, and significant, $\underline{z} = 7.769$, $\underline{p} < .001$. The effect of stress inoculation training for the 31 hypothesis tests employing no-contact control groups was somewhat larger, $\underline{r} = .414$, and significant, $\underline{z} = 13.450$, $\underline{p} < .001$. Again, the tendency for stress inoculation training to render stronger effects when compared to a no-contact control group than when compared to an equivalent control group was significant, $\underline{z} = 2.889$, $\underline{p} < .05$.

There was no significant effect of the type of control group on performance, $\underline{z} = 0.168$, $\underline{p} > .05$. The effect of stress inoculation training on enhancing performance for the 2 hypothesis tests employing equivalent control groups was of moderate magnitude, $\underline{r} = .319$, and significant, $\underline{z} = 2.776$, $\underline{p} < .05$. The effect of stress inoculation training for the 9 hypothesis tests employing

no-contact control groups was of small-to-moderate magnitude, $\underline{r} = .290$, and significant, $\underline{z} = 4.932$, $\underline{p} < .001$.

In summary, stress inoculation training was shown to have a significant impact whether the intervention was compared to an equivalent control group or to a no-contact control group. However, the data also indicate a tendency for stronger effects to be reported when the comparison of training effects was made to a no-contact control group than to an equivalent control group.

Discussion

This objective of this meta-analysis was two-fold. First was to establish the efficacy (or lack thereof) of stress inoculation training. Results of this analysis provide strong support for the effectiveness of stress inoculation training as a stress training intervention. Stress inoculation training was shown to be an effective approach for reducing performance anxiety, reducing state anxiety, and enhancing performance under stress. Using Cohen's (1977) benchmarks for effect sizes, the overall effect sizes obtained are all medium to large in magnitude. Furthermore, the pattern of results obtained is informative: Stress inoculation training shows the strongest effect on reducing performance anxiety, a somewhat smaller effect on reducing state anxiety, and again a somewhat smaller effect on improving performance. This hierarchy of results appears reasonable. Recall that measures of performance anxiety included test anxiety, speech anxiety, and other measures of anxiety specific to the skill being addressed in training; state anxiety included measures of state or situational anxiety; and performance measures reflected actual

improvement in performance. Thus, it is reasonable that stress inoculation training has a more direct impact on performance anxiety specific to the task at hand, a less direct impact on a relatively more distal measure of state anxiety, and a weaker effect on actual performance. Again, it should be emphasized that stress inoculation training resulted in moderate-to-strong improvements on all three outcome measures. However, we find further empirical evidence for the generally accepted folk wisdom that it is easier to get people to feel less performance-related anxiety than to actually perform better.

A second objective of this meta-analysis was to examine the extent to which the effectiveness of stress inoculation training varied as a function of factors such as the type of subject population or the experience level of the trainer. The results of these analyses identify the conditions under which stress inoculation training is effective, and provide practical guidelines for effective training implementation.

The results indicate that stress inoculation training is effective for both high-anxious and normal-anxiety subject populations. We had noted earlier the concern that because the stress inoculation training approach places a strong emphasis on modifying interfering cognitions, it may be less effective for a normal subject population that is less preoccupied with negative thoughts and beliefs. The data do not support this proposition; in fact the results show that, as a means to reduce performance anxiety, stress inoculation training is more effective for normal-anxiety trainees than it is for high-anxiety trainees. Overall, the data indicate that the effectiveness of

stress inoculation training is not limited by the type of trainee population, and that the positive benefits of training extend to normal anxiety as well as high anxiety populations.

The data also reveal that the beneficial effects of stress inoculation training on reducing performance anxiety and state anxiety increase as the number of training sessions increase. However, a question of more practical import is not only "Does the amount of training impact training effectiveness?" but "How much training is required to produce a positive effect?" One way to examine this question is to estimate the amount of training required to yield the mean effect size rendered by the studies in this database. This analysis indicated that the mean effect of stress inoculation training on performance anxiety was obtained with a length of training of approximately 6-7 sessions, and that the mean effect of stress inoculation training on state anxiety was obtained with a length of training of approximately 4-5 sessions. Furthermore, the data indicate that, for both performance anxiety and state anxiety, a single session of training was sufficient to produce a small-to-moderate improvement. Stress inoculation training practitioners caution that the amount of training required should be determined by the specifics of the situation--a prudent admonition. However, the results of this analysis reveal that stress inoculation training is a relatively robust intervention, and of special interest to those in applied training environments in which time and resources are often limited, stress inoculation training can be implemented successfully without an inordinate amount of training.

It is interesting to note that the number of training sessions did not predict the effect of training on performance. In other words, although stress inoculation training had an overall

positive and significant impact on enhancing performance, greater benefits did not accrue from more training. One possible reason for this result stems from the observation that the majority of studies in this database emphasize the application of stress inoculation training for anxiety reduction; that is, the primary orientation of stress inoculation training is to develop coping skills for reducing anxiety (see Meichenbaum & Deffenbacher, 1988). One indication of this is the fact that we were able to uncover 40 hypothesis tests of the effect of stress inoculation training on state anxiety and only 11 tests of the effect of stress inoculation training on performance. The point is that most studies of stress inoculation training place a greater emphasis on anxiety reduction per se, and relatively less emphasis on enhancing task performance. Accordingly, given that most training activities are oriented toward reducing anxiety, it is not surprising that the overall effect of training on performance is positive, but that more training does not lead to a greater enhancement of performance. In other words, reducing anxiety may be a necessary but not sufficient procedure for improving performance under stress. Of particular interest to those interested in enhancing performance in more applied settings, the fact that stress inoculation training is shown to lead to an overall improvement in performance is encouraging, and suggests that stress inoculation training interventions that are designed to focus more directly on enhancing performance under stress may yield even more positive results.

The analysis of the type of setting in which training took place (laboratory versus field settings) revealed that stress inoculation training is not a "hothouse" phenomenon. That is, the

positive effects of stress inoculation training are not laboratory-bound, but are shown to be as strong in the field as in the experimental laboratory.

The size of the training group was shown to be a significant moderator of training effectiveness. As the size of the training group increases, stress inoculation training becomes less effective in reducing state anxiety and in enhancing performance. This phenomenon is not surprising; the tendency for larger groups to decrease members' satisfaction and motivation, and cause group members to feel more anonymous and "lost in the crowd" has been well documented (see Mullen, 1991). Yet, for practical purposes, it is valuable to note that whereas the positive effects of stress inoculation training on reducing state anxiety and enhancing performance lessen with increasing group size, the data further indicate that stress inoculation training remains effective with groups of moderate (i.e, 8-10 persons) size.

However, the relationship between group size and training effectiveness is reversed for performance anxiety: The impact of stress inoculation training on reducing performance anxiety increases with increasing group size. Thus, the presence of a greater number of others in a training group did not cause subjects to feel less generally anxious or to perform better, however it did cause them to feel less anxiety related to performing the task.

The data further indicate that stress inoculation training has a significant impact on reducing performance anxiety, reducing state anxiety, and enhancing performance whether training is conducted by a more experienced or a less experienced trainer. Moreover, less experienced trainers are shown to be even more effective than more experienced trainers.

However, in interpreting this somewhat anomalous result, we note that within the studies in this database, the distinction between experienced (doctoral level and above) and less experienced trainers (below doctoral level) is not large. Most studies were conducted under academic auspices: Those studies coded as doctoral level or above were most often conducted by Ph.D. level faculty or a doctoral student. Those studies coded as below doctoral level were typically conducted by a master's student under the direct supervision of doctoral level faculty. So, we can conservatively conclude from this data that stress inoculation training can be successfully implemented by experienced trainers and those that are somewhat less experienced, and that within this database, master's level trainers do a somewhat better job than doctoral level trainers.

Finally, our analyses indicate that stress inoculation training has a significant positive impact whether the intervention is compared to an equivalent control group or to a no-contact control group. Stronger effects are reported, however, when training is compared to no-contact control groups. Therefore, the data suggest that some of the beneficial effect of stress inoculation training appears to simply be due to the fact that there is an intervention.

In summary, the results of the analysis of moderator variables suggest no obvious limitations on the application of stress inoculation training to normal training environments. Results indicate that stress inoculation training is effective for normal populations of trainees as well as highly-anxious populations, training can be implemented effectively in groups of moderate size and with a relatively modest number of training sessions, the effects of training are as robust in field settings as in the laboratory, and training can be implemented by less experienced as well

as Ph.D. level trainers. Therefore, although stress inoculation training has been most commonly employed as a clinical approach, the results of this analysis support the further application of this approach in applied settings.

There are, of course, limitations to our analysis, and to the implications that can be drawn from it. First, one goal of this meta-analysis was to integrate the literature on the effects of stress inoculation training on reducing anxiety and enhancing performance under stress. The studies included in this database were limited to those that examined the use of stress inoculation training as a stress training intervention, and thus excluded studies of the effectiveness of stress inoculation training for pain tolerance (Puder, 1988; Vallis, 1984), anger reduction (Moon & Eisler, 1983), or for controlling hypertension (Amigo, Buceta, Becona, & Bueno, 1991). Note that there are separate bodies of literature that deal with these cognate areas, and that the results of the current analysis are limited to the effects of stress inoculation training on reducing anxiety and enhancing performance under stress.

Second, this analysis allowed us to test several hypotheses regarding moderators of the effect of stress inoculation training. These moderators (such as the type of subject population or group size) were chosen because they were theoretically interesting (i.e., past research suggested their relationship to stress inoculation training) and because the available empirical literature allowed their examination (i.e., the information presented in the studies allowed this variable to be coded or rated). However, there were other potentially informative factors that we were not able to examine. For example, graduated practice, the practice of skills in a graduated manner across

increasing levels of stress, is described as a key component of skill practice and application (see Meichenbaum, 1993). However, there were so few studies in this database that actually implemented graduated practice that we were not able to examine the impact of this procedure. Thus, in this manner, a meta-analysis may often serve to point out what we don't know: The fact that we are not able to examine at the meta-analytic level the effect of factors such as graduated practice suggests areas that require further study.

Third, it is important to note that stress inoculation training is not a specific training technique, but is an integrated approach to reducing stress effects. The stress inoculation model describes three specific phases of training; however, the specific content of each phase may vary according to the specific training requirements. For example, any number of stress training techniques, such as attentional training, overlearning, or relaxation training, may be implemented in the skills acquisition and rehearsal phase of training. Therefore, training must be context-specific: The design of stress inoculation training for a task such as the manual repair of equipment under stress conditions will likely involve different types of skills training and practice than for a complex decision making task such as aircrew coordination. Further research is required to examine what stress inoculation training components and techniques are most effective under what conditions.

Finally, most of the studies included in this analysis were conducted relatively recently, indicating a considerable amount of current research activity in this area. Therefore, it seems especially timely to provide an integration and summary of existing research, to identify critical

relationships among variables and to provide practical guidelines for implementing training. The results of this analysis should clearly encourage further application and research activity. More research is needed to examine a more performance-based training approach for applied settings, that focuses more directly on enhancing performance under stress. Furthermore, it is prudent to examine the relationships uncovered at the meta-analytic level with further primary-level research. The stress inoculation training approach holds considerable promise as an effective method to reduce anxiety and enhance performance in stressful environments.

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Footnotes

[1] There were no studies in this database that reported reliability coefficients for the performance measures used, so adjustments for attenuation were not attempted. Furthermore, note that in Table 1, some articles contribute multiple effect sizes (e.g., Sweeney & Horan, 1982, contribute 3 hypothesis tests to the performance anxiety analysis). In the analyses, each hypothesis test was treated as an independent observation--an assumption of independence that is false. This inflates the significance levels of the combined probability tests. This type of violation has no effect on the mean $\underline{r}$ or $\underline{Z}_{Fisher}$ indices of effect size, however appropriate caution should be applied in interpreting combined probability and chi square values.

Table 1

Studies Included in the Stress Inoculation Training Meta-analysis

Study	Statistic	HYP[a]	N	r	POP[b]	EXP[c]	CON[d]	PRA[e]	NUM[f]	GRP[g]	SET[h]
Adams (1981)	t(32)=2.915	SA	20	.458	1	1	0	1	4	6.5	0
Altmaier et al. (1985)	t(23)=3.044	SA	18	.536	1	1	0	-	3	5	0
Altmaier & Happ (1985)	F(1,102)=12.13	P	114	.326	0	1	0	0	1	5	0
Blackmore (1983)	t(24)=3.091	PA	21	.534	0	-	0	-	5	13	0
Bloom & Hautaluoma (1990)	t(38)=2.929	SA	40	.429	1	-	1	0	1	5	0
"	r(38)=0.529	P	40	.529	1	-	1	0	1	5	0
"	t(38)=0.086	PA	40	-.014	1	-	1	0	1	5	0
Bosmajian (1981)	t(27)=1.065	SA	16	-.201	1	1	0	-	5	9	0
"	t(14)=0.303	PA	16	-.081	1	1	0	-	5	9	0
Cradock et al. (1978)	F(1,18)=18.699	PA	26	.714	1	0	0	1	6	6.5	1
De Boe (1985)	t(30)=0.592	SA	21	-.107	1	1	0	-	4	8	0
"	t(30)=0.021	SA	24	-.004	1	1	0	-	4	8	0
Deffenbacher & Hahnloser (1981)	t(41)=3.260	SA	21	.454	1	-	0	1	4	6	0
"	t(41)=4.301	SA	24	.558	1	-	0	1	4	6	0

table continues

Study	Statistic	HYP[a]	N	r	POP[b]	EXP[c]	CON[d]	PRA[e]	NUM[f]	GRP[g]	SET[h]
"	t(41)=4.028	SA	24	.532	1	-	0	1	4	6	0
"	t(41)=0.187	P	21	.029	1	-	0	1	4	6	0
"	t(41)=1.613	P	24	.244	1	-	0	1	4	6	0
"	t(41)=1.507	P	24	.229	1	-	0	1	4	6	0
Deikis (1982)	t(35)=1.046	SA	37	.174	0	1	1	-	8	19.3	0
"	t(35)=0.298	P	37	.050	0	1	1	-	8	19.3	0
Finger & Galassi (1977)	t(23)=0.356	P	25	.074	1	0	0	1	8	12	0
"	t(22)=1.026	P	24	.214	1	0	0	1	8	12	0
"	t(21)=0.492	P	23	.107	1	0	0	1	8	12	0
"	r(21)=0.553	SA	23	.553	1	0	0	1	8	12	0
"	r(22)=0.587	SA	24	.587	1	0	0	1	8	12	0
"	r(23)=0.405	SA	25	.405	1	0	0	1	8	12	0
Foley et al. (1987)	F(1,34)=6.37	SA	36	.397	1	1	1	0	6	1	1
Forman (1981)	F(1,13)=16.863	SA	16	.751	0	1	0	-	6	8	1
Forman (1982)	F(1,22)=4.116	SA	24	.397	0	-	0	-	6	12	0
Jay & Elliott (1990)	F(1,54)=14.42	SA	72	.459	0	1	0	-	1	1	1
Kendall et al. (1979)	t(40)=0.438	SA	22	.069	1	1	1	-	1	1	1
"	t(40)=0.325	SA	22	.051	1	1	1	-	1	1	1
Kubiak (1987)	F(1,110)=1.566	SA	112	.118	0	0	1	-	10	-	1

table continues

Study	Statistic	HYP[a]	N	r	POP[b]	EXP[c]	CON[d]	PRA[e]	NUM[f]	GRP[g]	SET[h]
Lustman & Sowa (1983)	F(1,10)=0.738	PA	16	.262	0	1	0	0	10	1	1
Mace & Carroll (1985)	t(36)=3.411	SA	20	.494	0	-	0	-	7	10	1
Mason (1988)	F(1,52)=162.908	PA	54	.871	0	0	0	1	8	8	0
"	F(1,52)=1.496	P	54	.167	0	0	0	1	8	8	0
Neumann (1980)	F(1,18)=3.54	SA	20	.405	1	1	1	0	3	8	0
Payne & Manning (1990)	t(63)=2.823	PA	41	.335	1	-	1	-	1	-	1
"	t(63)=3.314	PA	46	.385	1	-	1	-	1	-	1
Pruitt (1986)	F(1,48)=14.234	PA	26	.479	1	1	1	-	6	8.5	1
Register et al. (1991)	F(1,234)=71.229	PA	121	.483	1	0	1	1	-	1	0
"	F(1,234)=87.719	SA	121	.522	1	0	1	1	-	1	0
Roberts (1988)	t(47)=1.331	SA	40	.191	1	1	0	-	6	10	1
Russler (1986)	F(1,216)=-0.700	SA	38	-.057	0	1	1	-	2	19	0
"	F(1,216)=-0.420	SA	38	-.044	0	1	0	-	2	19	0
Schneider (1989)	F(1,36)=68.898	SA	30	.810	1	-	0	-	6	15	0
"	F(1,36)=27.125	PA	30	.656	1	-	0	-	6	15	0
Settle (1990)	t(46)=3.69	SA	49	.478	1	1	0	-	7	8	1

table continues

Study	Statistic	HYP[a]	N	r	POP[b]	EXP[c]	CON[d]	PRA[e]	NUM[f]	GRP[g]	SET[h]
Sharp & Foreman (1985)	F(1,114)=262.974	SA	40	.835	1	0	0	-	8	10	1
"	F(1,114)=98.427	PA	40	.681	1	0	0	-	8	10	1
Smith (1989)	F(1,33)=10.54	PA	36	.492	1	1	0	1	5	-	0
"	F(1,33)=11.31	SA	36	.505	1	1	0	1	5	-	0
Smith & Nye (1989)	t(45)=5.242	PA	35	.616	1	1	0	1	6	9.5	0
"	t(45)=3.251	PA	38	.436	1	1	0	1	6	9.5	0
"	t(45)=0.115	SA	35	-.017	1	1	0	1	6	9.5	0
"	t(45)=2.257	SA	38	-.319	1	1	0	1	6	9.5	0
Sweeney & Horan (1982)	r(16)=0.468	PA	18	.468	1	0	0	0	6	3.5	0
"	r(16)=0.466	PA	18	.466	1	0	0	0	6	3.5	0
"	r(16)=0.581	PA	18	.581	1	0	0	0	6	3.5	0
"	t(16)=2.399	SA	18	.514	1	0	0	0	6	3.5	0
"	t(16)=2.933	SA	18	.591	1	0	0	0	6	3.5	0
"	t(16)=3.389	SA	18	.646	1	0	0	0	6	3.5	0
Tableman et al. (1982)	t(72)=3.055	SA	74	.339	1	0	0	0	10	9	1
Ulissi (1980)	t(21)=2.610	SA	16	.495	1	1	0	-	5	1	0
Weinberger (1988)	F(1,48)=14.069	SA	20	.476	1	1	0	0	4	10	1
Ysaguirre (1990)	F(1,41)=11.342	SA	30	.466	0	1	0	-	5	16	1

table continues

Study	Statistic	HYP[a]	N	r	POP[b]	EXP[c]	CON[d]	PRA[e]	NUM[f]	GRP[g]	SET[h]
"	F(1,41)=6.542	SA	31	.371	0	1	0	-	5	17	1
Zeidner et al. (1988)	r(21)=0.849	P	24	.849	1	0	0	0	8	1	1
"	F(1,21)=0.38	PA	24	.133	1	0	0	0	8	1	1

Note:

[a] PA: Performance anxiety; SA: State anxiety; P: Performance

[b] POP: Population; High anxious = 1, Normal anxiety = 0

[c] EXP: Experience of the trainer; Doctoral level or above = 1, Below doctoral level = 0

[d] CON: Type of control group; Equivalent = 1, No contact = 0

[e] PRA: Type of skills practice; Imagery = 1, Behavioral = 0

[f] NUM: Number of practice sessions

[g] GRP: Group size

[h] SET: Setting; Field = 1, Laboratory = 0

Table 2

Combinations of Significance Levels and Effect Sizes: Effect of Stress Inoculation Training on Performance Anxiety, State Anxiety, and Performance

		Performance Anxiety	State Anxiety	Performance
	k	19	40	11
Effect size	Z_{Fisher}	.562	.392	.305
	r	.509	.373	.296
Significance	z	15.929	14.953	5.602
	p	< .001	< .001	< .001

Table 3

Combinations of Significance Levels and Effect Sizes and Focused Comparison: High Anxiety Versus Normal Anxiety Subjects

		Performance Anxiety	State Anxiety	Performance
High Anxiety	k	16	30	8
Effect size	Z_{Fisher}	.496	.444	.367
	r	.459	.417	.352
Significance	z	13.773	15.450	5.183
	p	< .001	< .001	< .001
Normal Anxiety	k	3	10	3
Effect size	Z_{Fisher}	.977	.276	.242
	r	.752	.269	.237
Significance	z	8.879	4.473	3.508
	p	< .001	< .001	< .001
Focused Comparison	z	1.783	1.084	1.431
	p	< .05	> .05	> .05

Table 4

Combinations of Significance Levels and Effect Sizes and Focused Comparison: Field versus Laboratory Settings

		Performance Anxiety	State Anxiety	Performance
Field	k	7	14	1
Effect size	Z_{Fisher}	.505	.408	1.253
	r	.466	.387	.849
Significance	z	9.242	9.539	5.114
	p	< .001	< .001	< .001
Laboratory	k	12	26	10
Effect size	Z_{Fisher}	.590	.380	.246
	r	.530	.363	.241
Significance	z	13.107	11.626	4.851
	p	< .001	< .001	< .001
Focused Comparison	z	.612	.996	4.617
	p	> .05	> .05	<.001

Table 5

Combinations of Significance Levels and Effect Sizes and Focused Comparison: Imagery Versus Behavioral Skills Practice

		Performance Anxiety	State Anxiety	Performance
Imagery	k	6	11	7
Effect size	Z_{Fisher}	.714	.429	.158
	r	.613	.404	.157
Significance	z	12.700	10.370	2.361
	p	< .001	< .001	< .05
Behavioral	k	6	8	3
Effect size	Z_{Fisher}	.277	.471	.518
	r	.270	.439	.476
Significance	z	2.401	6.539	5.261
	p	< .05	< .001	< .001
Focused Comparison	z	3.374	.964	4.570
	p	< .001	> .05	< .001

Table 6

Combinations of Significance Levels and Effect Sizes and Focused Comparison: Experienced Versus Less Experienced Trainers

		Performance Anxiety	State Anxiety	Performance
Experienced	k	6	26	7
Effect size	Z_{Fisher}	.472	.294	.226
	r	.440	.286	.222
Significance	z	6.765	7.854	3.892
	p	< .001	< .001	< .001
Less Experienced	k	8	10	3
Effect size	Z_{Fisher}	.708	.497	.398
	r	.609	.460	.378
Significance	z	13.494	11.375	3.067
	p	< .001	< .001	< .05
Focused Comparison	z	2.326	3.919	2.387
	p	< .05	< .001	< .05